Performance Work Statement (PWS)

for

Design and Construction of a Green Infrastructure Stormwater Best Management Practice Retrofit for One or More Municipal Properties on Cape Cod – A Demonstration and Education and Outreach Project

secured under

**U.S. EPA Region 1, Blanket Purchase Agreement,
Contract #EP-BPA-13-W-0001 (expiration date Oct 18, 2017)**

August 28, 2014

I. Objective

The specific objective of this green infrastructure (**GI**) implementation demonstration and education and outreach (E&O) project is to design and construct one or two GI stormwater best management practice (BMP) retrofits for control and treatment of nitrogen on Cape Cod, Massachusetts. An additional objective is to ensure that the constructed BMP(s) are designed to accommodate influent and effluent flow and water quality monitoring equipment in order to collect flow-weighted composite samples. EPA plans to conduct monitoring and use the collected data to assess the performance and develop performance curves for the BMP(s).

The project is intended to increase practitioner acceptance of GI as an effective stormwater management approach for treating and controlling nutrient pollution - principally nitrogen on Cape Cod. Nitrogen is a significant pollutant contributing to nitrogen impairments in several embayment's. Incorporating stormwater BMPs for control of nitrogen is an increasingly important aspect of protecting these and other estuaries across New England.

In brief, the project will have a number of elements:

- Independent estimation / confirmation by the Contractor that the Cape Cod sites identified by EPA through its Preliminary Site Selection process are suitable for BMP implementation;
- Design of nitrogen-treating BMP retrofit(s) to meet the objectives set forth above;
- Construction of the BMP retrofits (including, development of an operation and maintenance (O&M) plan for the BMPs);
- Development of a monitoring program to assess BMP performance; and
- Education and outreach tailored to both the public and to stormwater practitioners. Education and outreach components may include signage at the site, public events, and general and technical outreach materials.

The project schedule is somewhat dependent upon the Cape Cod summer vacation season. Consequently, the schedule presumes commencement of construction in the early spring of 2015 with a target completion date of May 1, 2015, if possible.

II. Introduction

EPA is interested in retrofitting existing stormwater discharges using innovatively-engineered GI stormwater BMPs on Cape Cod as a model for promoting public awareness and building public support for the problems and challenges associated with stormwater, including control of stormwater flow (e.g., flooding) and pollution (nitrogen). EPA New England has a strong interest in supporting the Massachusetts Department of Environmental Protection's (MassDEP) Cape Cod TMDLs for total nitrogen and the planned Clean Water Act section 208 water quality plan (WQP) update under development by the Cape Cod Commission (**CCC**).

EPA is coordinating with the Cape Cod Commission, Association for the Preservation of Cape Cod, MassDEP, interested Cape Cod municipalities, as well as other interested partners (e.g., Coastal Zone Management Agency, Massachusetts Department of Transportation (RIDOT), etc.) to identify up to two priority municipal / public sites for the project. We plan to select sites in locations that are consistent with these TMDL's and the section 208 WQP update. The work conducted as part of this project would have broader applicability throughout all of New England.

A project for the design and construction of a stormwater BMP to control and treat nitrogen aligns closely with EPA priorities, including: promoting the appropriate application of GI and low impact development (LID) (incl., potential installation in Environmental Justice and/or Brownfields areas); developing sustainable communities; disconnecting directly-connected impervious area; using technologies that improve stormwater infiltration and lead to reductions in runoff volume and peak volume discharge; improving water quality; and, if sited in a combined sewer area, potentially reducing combined sewer overflow (CSO) events. In addition, this project may also be used in the future by state and local practitioners to leverage additional state or local funds for constructing more BMPs at other priority sites across the Cape. Lastly, an objective of this project is to engage local planners as well as department of public works personnel in understanding the installation techniques and O&M approaches for GI practices.

EPA's role in this project is critical to demonstrating federal support, transferring technical expertise, and directly tying municipal stormwater actions to EPA's efforts to improve water quality on Cape Cod and to implement the Southeastern New England Partnership for Coastal Watershed Protection. Both stormwater and nutrients are high priorities of these EPA programs, and upon completion of this project, the connections between EPA's work (incl., permitting, non-point source and estuary programs) and municipal stormwater management will be strengthened.

In addition, EPA anticipates this E&O project will enhance local partnerships under the Clean Water Act section 208 plan update and the implementation of nitrogen TMDLs. The project will be a transferable model to help solve water quality problems in developed areas of the Cape Cod watersheds, but also will encourage the community to think about stormwater management as a viable and cost-effective tool to improve water quality (and thus recreational opportunities), reduce flooding, and create potential assets and amenities for revitalizing communities and building more livable neighborhoods.

III. EPA Preliminary Site Selection (PSS) Process

EPA has initiated and concluded its coordination with various stakeholders to identify one or more potential sites for project consideration. For convenience, these sites may be referred to as **"Preliminary Site Selections" (PSS)**. [1]

The PSS process may be summarized as follows: In coordination with the CCC and MassDEP, we developed a project solicitation seeking communities interested in direct assistance for stormwater system design and construction. The solicitation were targeted to southern Cape Cod communities draining to Nantucket Sound; the solicitation was sent on June 11, 2014 **(Attachment 1)** and brief project proposals were due by July 2, 2014. EPA received a number of responses to the solicitation, and during the period of July 15 through July 23, we visited each municipality / site to better understand each proposal. During the site visits, we collected additional site selection data, took photographs, and generally clarified the nature and scope of each proposal. Subsequently, the site data was consolidated and discussed among EPA team members.

In general, the sites were compared on the basis of potential load reduction targets (both total nitrogen load and the nitrogen load contribution from stormwater) and 'overall project feasibility.' For purposes here, overall project feasibility included, among other things, the degree and extent of municipal interest and willingness to contribute materially to the project; the potential visibility of the site for E&O; the size of the sub-watershed targeted for treatment / retrofit; the physical space available for siting and sizing a BMP for treatment of nitrogen; technical feasibility; and the amenability a given site might provide for assessing BMP performance. [2]

On the basis of the information EPA received and its PSS process, we are proffering the following sites for development of a GMP under this PWS: [3]

- **Gateway Marina / Hyannis Inner Harbor** area located at 135 South Street and 115 Pleasant Street, Barnstable, MA. Supporting documentation is attached as **Attachment 2A**. From Barnstable's Letter of Interest response to our project solicitation:

  > Hyannis Inner Harbor is listed on the Massachusetts Year 2012 Integrated List of Waters as a Category 5 water body (Segment ID: MA96-82) impaired by both Fecal Coliform and Total Nitrogen. Additionally, a completed Massachusetts Estuaries Project (MEP) Report has supported a Draft TMDL for nitrogen (Report # 96-TMDL-18 Control #314). MEP Ecological Indicators for Hyannis Inner Harbor indicate the

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[1] The objective of the PSS process conducted by EPA and its stakeholders was intended to simplify and streamline site selection for the project and EPA's Contractor by considering multiple overall program and stakeholder objectives, and more generally by considering how the existing funding may be best tailored for the overall project and scope. The actual number of sites/BMPs will depend in large part on the outcome of the Contractors own due diligence in confirming the preliminary site selections provided.

[2] During site visits, it became evident that in many cases, the area available for BMP retrofit placement were significantly geographically constrained, particularly in comparison to the size of the MS4 catchment/sub-catchment. Consequently, overall project feasibility may ultimately depend upon engineering consideration of BMP retrofit sizing. Even when considering treatment of less than 1 or even 0.5 inch water quality volume (WQv) storms (appropriate for treatment of nitrogen), BMP sizing is likely to be a significant factor in determining project feasibility. As will be discussed, this problem is exaggerated because the Tedeschi-type bioinfiltration system proposed for this project requires that the BMP contain the entire WQv.

[3] The Contractor will conduct independent due diligence activities to confirm its GMP submitted in response to this Performance Work Statement, which may or may not result in a modification to this work order.

> water body is "Moderately Impaired" requiring a total attenuated watershed nitrogen load reduction of 41.5%.[4] With a significant portion of the controllable load contributed by storm water runoff from impervious surfaces (21%) the need for additional stormwater management is clear. Nearly all of the area is sewered.

As stated in the footnote below, the nitrogen reduction target for the subwatershed is 68.7%. The component of this percent attributable to stormwater is not clear but is likely to be in the range of 5-15%. This drainage area for the catchment is 8.4 acres; the acreage attributable to impervious cover (IC) is not clear (assumed to be about 50%). Refer to File: 2A – Hyannis Inner Harbor.pdf, and File: 2A – Gateway Marina Area GIS.pdf). The site is situated in close proximity to the harbor, so depth to groundwater (**GW**) is likely to be quite shallow (e.g., 4-10 ft. below grade (**BG**)). The area provided for siting a BMP is 0.35 acres, but from the photos provided of the area, the actual area available is located off a brick path that winds along and between private properties and is very likely to be less than 0.35 acres; more like 0.25. Refer to Photos: 2A – Barnstable 01 - 04). Consequently, the area is particularly geographically constrained. However, the MS4 line leading to the outfall in Hyannis Inner Harbor slopes downhill in relative close proximity to the siting area and a catch basin (**CB**) where the MS4 flow from the catchment may be intercepted is located at the top of this slope in a municipally-owned parking lot. Refer to MH–30 and CB–25 on plan that is File: 2A – Gateway Outfall Pipe System sheet 4 of 4.pdf; refer also to Photos: 2A – Barnstable 05 and 06). Tie-in would likely occur at or near MH-30 and CB-25; the invert of this CB is located approximately 4 feet below ground level (ft. BG). It would then be necessary to trench down and along a narrow access way (currently wooded) located between a municipal building (leased to a Nautical Museum) and a private residence. Based on observations made during our PSS site visit, access to and excavation of such a trench is feasible but would require clearing and removal of unwanted vegetation (perhaps including one or more small trees); and temporary disconnection of two air conditioning units (A/C) used for the Museum, demolition of the concrete pads on which the A/C units reside and re-pouring new concrete pads and re-connection of the A/C units following construction. Refer to Photos: 2A – Barnstable 07 – 09 (in Photo 09, site is shown thru trees along with private property boundary fence). Assuming construction would occur in the months of April and/or May, there should be no need for A/C at the Museum. The distance between the diversion CB and the site is approximately 50 feet, access can be from both above and below, and there is sufficient room for a small excavating backhoe with a careful operator. The nature of much of the vegetation is apparently invasive or unwanted; the municipality has expressed no reservation in its removal. The only caution might be excavation of root systems that run close to the respective property boundaries, and otherwise operating is close proximity to the Museum building. A small shed housing sampling equipment could be erected just at the bottom of the slope near the Museum building, and where currently site photos evidence a patch of shrubs and flowers which the municipality indicates are expendable. Refer to Photos: 2A – Barnstable 04 and 10.

It would appear existing soils located along and near the brick pathway could be re-graded so that the slope along the pathway would be increased and the soils relocated along the fence on the opposite side which delineates the boundaries of private property. Refer to Photos: 2A – Barnstable 02, 03 and 11. If so, it would be prudent to erect a fence of aesthetic character (e.g., split rail) at the completion of construction activities to run along this brick pathway. Upon grading the site in such a fashion, the BMP trench would likely run down the one/upper gradient

[4] The subwatershed nitrogen reduction target is 68.7%.

side of the site and then down the other/lower gradient side and tie back into the MS4 at a convenient point at the bottom of the slope. Project feasibility at this site appear to depend on assessment of BMP sizing and delivery of the MS4 flow to the BMP. We performed some preliminary sizing calculations which tend to suggest that the site could accommodate an approximate 0.2-0.3 inch WQv. If the porosity of the system is greater than 0.35, then it might just accommodate a 0.4 inch WQv which, as described below, would correspond to an approximate 72% nitrogen removal performance efficiency. The municipality will need to provide, or EPA or the Contractor will need to determine the percentage of IC in the catchment.

The advantages of the site include a real reduction in nitrogen (**N**) load to Hyannis Inner Harbor, a municipality demonstrating sound experience managing a significant MS4 (Barnstable is apparently the 4th largest municipality in Massachusetts) and that is genuinely interested in accommodating a BMP retrofit and positioned to provide in-kind services (to be determined; e.g., electrical service to a monitoring shed, development of film documentary for a local cable channel, assistance with monitoring), overall excellent public visibility for SW education and outreach management on the Cape (refer to Photos: 2A – Barnstable 12 and 13), and a bona fide retrofit challenge for a Tedeschi-type bioretention BMP for the control of nitrogen (discussed in more detail below). The disadvantages are the current uncertainties of BMP sizing, delivery of MS4 flow to the BMP, incorporation of controls for TSS and pathogens (to the maximum extent practicable), and depth to groundwater.

The Contractor's independent assessment will be needed to confirm the site as feasible for the project.

- **A currently undeveloped municipal parcel located where Oyster Pond Furlong Avenue and Asegame Run intersect in Chatham, MA.** Supporting documentation is attached as **Attachment 2B**. From Chatham's Letter of Interest response to our project solicitation:

> The Town has been actively working to address stormwater problems affecting local water resources for over twenty five years, originally targeting bacterial contamination of shellfish growing areas but increasingly directed toward nutrient reduction. . . . Oyster Pond (listed in the Proposed MA Year 2014 Integrated List of Waters as Category 4A with TMDLs for Fecal Coliform (EPA #36772) and Nitrogen (Total) (EPA #36219) is a tidal estuary located at the head of the Stage Harbor Complex that drains to Nantucket Sound. . . . The Pond is [ecologically] important [in that it] support[s] significant shellfish resources and as a nursery for multiple finfish species.

The nitrogen reduction target for the subwatershed is 85%. The component of this percent attributable to stormwater is 15%. This drainage area for the catchment is 18.33 acres of which 35% is attributable to IC. The area provided for siting a BMP appears to be in excess of one (1) acre. Refer to Files: 2B – Contributing Drainage Area.pdf, 2B – 2010 aerial photo 1.pdf, 2B – 2010 aerial photo 2.pdf and 2B – MESA figure.pdf.

The site is currently quite appreciably overgrown with shrubs (some trees) and would need to be cleared (and modified for ramp access) to accommodate site access and BMP construction. Refer to Photos 2B – Chatham 01 – 04. Depth to GW at the basin elevation of the parcel may be as shallow as 4 feet BG (refer to discussion of Construction General Permitting, Section IV(3) below), implicating potential challenges for excavating a BMP trench and/or siting a potential infiltration BMP. Diversion of MS4 flow would occur at a CB located at the intersection of

Oyster Pond Furlong Avenue and Asegame Run and the flow would be gravity fed to the BMP situated at an elevation below the roadway. Refer to Photo 2B – Chatham 05. The slope down to the basin area is quite steep, but if site conditions are otherwise favorable and the site can be cleared, there is more than adequate area for operating equipment and constructing a BMP. Situated at the far lower end of the Cape, the site is perhaps not optimally located from a logistical standpoint (e.g., travel to/from the site, delivery of materials by heavy truck thru winding back roads) but is otherwise well-suited for open access and field activities.

There currently exists an open drainage ditch – a historical but still utilized artifact of the watershed - which traverses the parcel from its northwest corner to the southeast corner, and where at some point further downgradient from the site, this drainage ditch apparently becomes piped and ties into the MS4 line just prior to discharge to Oyster Pond. Refer to Photos: 2B – Chatham 06 – 08 (Photo 08 showing approximate point on Asegame Run where trench intersects MS4). It's likely this drainage ditch is a conveyance subject to regulation under NPDES and is probably already considered part of the MS4 system. Our NPDES permitting program has indicated that the BMP could discharge to this drainage ditch which, if the BMP is designed to infiltrate bypass flow in excess of the capacity of the N BMP (i.e., 1+ inch WQv), would appear feasible. Otherwise, discharge from the BMP could conceivably require trenching to the piped MS4 and this would implicate obtaining access agreements from private property owners. The suitability of this drainage ditch for discharge is currently uncertain and its condition and capacity for the purpose would need to be assessed.

The site area would appear to offer an opportunity to treat up to 1+ inches of WQv where it is assumed the N BMP would preferentially treat up to 0.4 inches of WQv and both the N BMP discharge and the excess flow above the 0.4 inch threshold would bypass to a second BMP (viz., infiltration basin) designed to control and treat both TSS and pathogens (e.g., fecal coliform). The site should be able to accommodate a fore bay for settling particulates and trapping floatables.

In addition, an electrical service pole is located at the roadway intersection which could be utilized to provide electrical service to a monitoring shed that could be erected at a convenient location for monitoring purposes. The municipality is well experienced in environmental monitoring and its Director of Health and Environment, Robert Duncanson, Ph.D., has provided assurance that the municipality could oversee most basic monitoring aspects of the project with the exception of more specialized nitrogen analytical procedures which we assume our own New England regional Laboratory (NERL) would provide. Consequently, the Contractor should assume for this site as well as for the Barnstable site (above) that the scope of services for performance monitoring would be design and construction of the site monitoring equipment and infrastructure; once constructed, the contractor will work closely with the municipality and EPA to initiate the monitoring and ensure all monitoring infrastructure is operating properly. This will include some oversight and training of the municipality for a period of time (assume 4 to 5 storm events). After that period, the municipality will take over the operation and maintenance of the equipment. Refer to Task 4 (page 19) for more information.

The advantages of the site include a real reduction in nitrogen (N) load to Oyster Pond; a municipality demonstrating sound experience with management of estuaries and related permitting issues and that is genuinely interested in accommodating a BMP retrofit and positioned to provide in-kind services (to be determined; e.g., electrical service to a monitoring shed, development of film documentary for a local cable channel, assistance with monitoring); the possibility for treating a minimum 0.4 inch or greater WQv for N and quite likely capturing and treating a 1 inch or larger WQv for control and treatment of TSS and pathogens, which would effectively eliminate SW discharge from this entire catchment to Oyster Pond; and a bona fide retrofit challenge for a Tedeschi-type N BMP. The disadvantages are the current uncertainties of MS4 flow delivery and depth to groundwater, site clearing and site access for equipment, and perhaps less than optimal public visibility.

IV. Basic Design Considerations

The Contractor shall use, as appropriate, the information below in this subsection to aid design and construction, and development of a GMP for this PWS. The Contractor may as appropriate amend this information on the basis of its professional judgment; any such amendments or deviations shall be set forth in its response to this PWS.

1. Implications of the Tedeschi Bioretention System on BMP Sizing

As a threshold matter for determining overall project feasibility, the Contractor will need to determine the size of each BMP as a function of available space and water quality volume (**WQv**), which in the case of the Tedeschi Bioretention System is the total physical storage capacity of the system (**storage capacity**); and the storage capacity is the sum of the Internal Storage Reservoir (**ISR**), the pore volume of unsaturated media above the ISR (**PV_{unsat}**) and the pond storage (**PS**):

$$WQv = \text{storage capacity} = ISR + PV_{unsat} + PS$$

In brief, the Tedeschi bioretention system is a trench-based system (hereafter, **Tedeschi-type bioretention BMP; N BMP; or variants thereof**). In pertinent part, the trench contains a storage / treatment reservoir consisting of ¾ inch crushed stone. Refer to **Attachment 3** (providing technical background information on the Tedeschi bioretention system).

Denitrification[5] is attained to the extent that portion of the WQv is captured and contained within the reservoir for a period of time long enough to allow the system to achieve the anoxic conditions which favor and allow for denitrification. Nitrate and nitrite are highly soluble which allows BMPs designed for control of nitrogen to be designed for smaller 'first flush' water quality volumes than might be designed for other pollutants, such as total suspended solids, bacteria, phosphorus, or for the control of flooding. In general, it is possible to appreciably control nitrogen by capturing and treating runoff from

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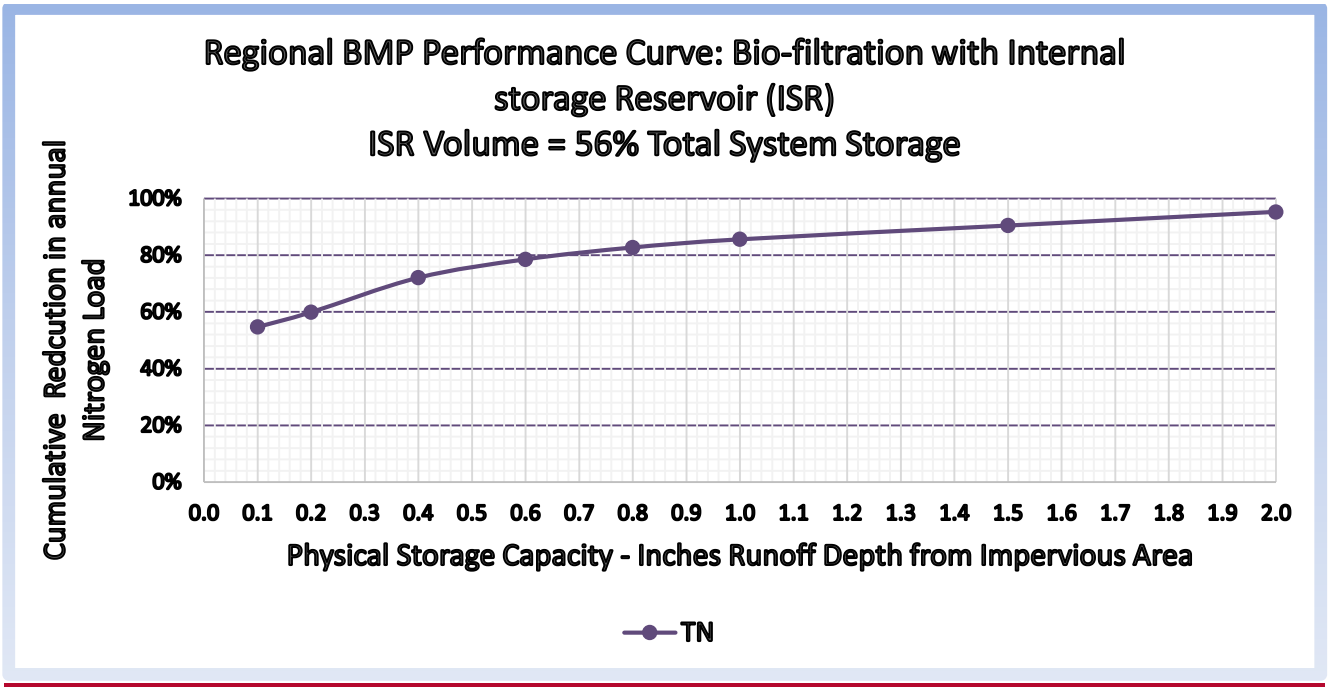
[5] Denitrification is the biochemical reduction of oxidized nitrogen anions, nitrate (NO^{-3}) and nitrite (NO^{-2}) to produce the gaseous products nitric oxide (NO), nitrous oxide (N_2O) and nitrogen gas (N_2), with concomitant oxidation of organic matter. Denitrification is considered to be the predominant microbial process that modifies the chemical composition of nitrogen in a wetland system and the major process whereby nitrogen is returned to the atmosphere (N_2). The general sequence is as follows: $NO^{-3} \rightarrow NO^{-2} \rightarrow NO \rightarrow N_2O \rightarrow N_2$. The end products, N_2O and N_2 are gases that re-enter the atmosphere. Denitrification can occur readily in anaerobic environments. Oxygen deficiency causes certain bacteria to use nitrate in place of oxygen as an electron acceptor for the oxidation of organic matter. The Tedeschi bioretention system filter media (or BSM) is amended to incorporate organic matter. Stormwater itself may contain sufficient organic matter for denitrification.

small-scale events (e.g., 0.2 to 0.4 inches) and the early portions of larger storm events. At first glance, these systems are highly amenable for the geographically-constrained urban environment.

However, because the entire target WQv is to be captured and held within the system, a conservative manner to estimate BMP sizing is to set the WQv to the porosity of the ISR. Assuming the porosity of an ISR containing ¾ inch crushed stone is approximately 0.35,[6] the total volumetric footprint of the system is then *approximately* (1/0.35)WQv, which potentially significantly increases the challenge of incorporating such systems into highly geo-constrained areas.

This porosity-increased volumetric footprint of the system may be counter offset if this 'target WQv' is reduced; from the performance curves developed for the Durham, NH Tedeschi system,[7] at some point, there is a trade-off in performance. In short, for highly geo-constrained sites, BMP sizing is a critical design factor and may determine project feasibility as a threshold matter (e.g., the Gateway Marina, Barnstable, MA site). From the curve below, providing a total physical storage capacity that can hold 0.4 inch of runoff from the contributing impervious area would achieve a 72% removal efficiency for total nitrogen.



[6] Table 1 of the December 31, 2012 Tetra-Tech Technical Memorandum entitled, "Development of Cumulative Performance Curves for an Enhanced Bioretention BMP" (Attachment 2), indicates the porosity of Cell #2 of the Durham, NH system is 0.42. In short, applying a porosity of 0.35 and assuming the WQv = ISR helped ensure our assessment of potential feasibility for purposes of screening PSS locations was conservative.

[7] We had intended to provide the 'High Density Residential' land use performance curve in the Tetra-Tech Memo (*Ibid.* at page 14), but opted as part of final review of this PWS to provide a curve specific to nitrogen and which clarifies the storage capacity as a function of ISR.

2. Implications of delivering the target WQv from an MS4 to the Tedeschi Bioretention BMP Retrofit

The Contractor will need to consider and resolve the problem of delivering a target WQv (i.e., storage capacity) from an MS4 system to a Tedeschi-type bioretention retrofit.

Both the Barnstable and Chatham sites contemplate tie-in and diversion of MS4 flow. Conceptually at least, delivery of flow from MS4 catchments on the order of 8.4 and 18.33 acres (respectively) poses a potential design challenge: unrestricted laminar (if not turbulent) flow from an MS4 is to be delivered to a geographically-constrained trench containing materials that will resist flow. If controlling parameters are not carefully balanced, flow could 'back up' the MS4 (potentially overflowing and dynamically increasing potentiometric head on relief points), cause bypass of desired WQv at the diversion point and/or overflow the BMP.

The problem would appear to be an application of Darcy's Law, which describes fluid flow in saturated porous media:

$$Q = \frac{-k\,A}{\mu}\,\frac{(P_b - P_a)}{L}$$

where, the total discharge, Q (units of volume per time, e.g., m^3/s) is equal to the product of the intrinsic permeability of the medium, k (m^2), the cross-sectional area to flow, A (m^2), and the total pressure drop (P_b - P_a), (Pa), divided by the viscosity, μ (Pa·s), and the length over which the pressure drop is taking place (L). From Darcy's law, the problem is related to the difference in k between the two systems: [8]

$$k_{BMP} << k_{MS4}$$

where MS4 flow is unrestricted (i.e., resistance to flow is practically negligible) and where BMP flow is through an engineered porous media.

Conceptually, it might appear that increasing the discharge area or increasing the ponding length and area of the trench would accommodate the flow. However, at least in the Barnstable case, it is not clear whether increasing area or length is possible even at storage capacities of 0.2 to 0.4 inches; nor is it clear whether a design could accommodate a fore bay adequate for the transition; rather, the problem may need to be engineered into a diversion structure and the piping system.

Considering the size of the Chatham drainage area (18.33 acres) or the severe geographic constraints posed by the Barnstable site, the problem begs to be resolved mathematically; and assuming a solution is feasible, carefully engineered / implemented. For instance, it may be that a specially-designed diversion structure containing a weir of a specific increased length need be designed and installed.

Because the problem potentially implicates BMP performance or even infrastructure failure (in the case that flow to a BMP sited near private property cannot be contained), we request the problem be resolved for the administrative record by having engineering calculations performed on engineering paper. For these calculations, we *presume* a hydrograph of a representative target storm (e.g., 0.4 inches) *might* be utilized to determine a highly-conservative peak volume and rate of flow to the MS4. This flow would be set as the Darcy, Q, and with values of k provided by the literature, various iterations of parameters

[8] In the design context of each particular site, the problem might be complicated by the velocity of discharge.

A and L performed against/compared to BMP dimensions obtained by sizing for WQv (i.e., storage capacity).

If the Contractor believes the problem is one of common practice and where certain engineering and/or infrastructure approaches readily exist to accommodate the problem, then a mathematical demonstration may not be needed, and it shall specifically identify such common practices and approaches.

3. Permitting

In part because EPA Region 1 is currently the National Pollutant Discharge and Elimination System (NPDES) permitting authority for the State of Massachusetts, we wish to ensure that all relevant and applicable State standards are incorporated into the project(s).

In Massachusetts, Stormwater Management Standards have been incorporated into both the Wetlands Protection Act (WPA) regulations, 310 CMR 10.05(6)(k) and Water Quality Certification (WQC) regulations, 314 CMR 0.06(6)(a) (incl. Mass Stormwater Handbook). Refer to http://www.mass.gov/eea/agencies/massdep/water/regulations/massachusetts-stormwater-handbook.html. In pertinent part, these regulations generally require proposed BMPs to be consistent with approved TMDLs:

> If a proponent is proposing a project that is in the watershed of a water body with a TMDL, and if the project is subject to wetlands jurisdiction, the proponent must select structural BMPs that are consistent with the TMDL. Because pollution prevention is an interest identified in the Wetlands Protection Act, conservation commissions and MassDEP may require use of such BMPs when reviewing projects subject to jurisdiction under the Act.

SW Handbook at Vol. 1, Ch. 2, p. 13. *See also*, Mass SW Handbook at Vol. 1, Ch. 1, fn 15 (referring to Vol. 1 Ch. 2). On the basis of personal conversation with MassDEP, the authority for this qualitative requirement vests in the Conservation Commission and is discretionary.

In addition to this qualitative standard applicable where there is a TMDL, the contemplated BMP retrofits are considered "Redevelopments" for purposes of WPA jurisdiction and are therefore subject to the requirements of Standard 7, which provides in pertinent part:

> **Standard 7.** A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structural stormwater best management practice requirements of Standards 4, 5, and 6. Existing stormwater discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment project shall also comply with all other requirements of the Stormwater Management Standards and improve existing conditions.

In particular, Standard 4 provides: "Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS) [from a 0.5 inch WQv]." In the context of stormwater retrofits, the intent of the Mass SW regulations is to achieve compliance to the maximum extent practicable. On the basis of this information:

- **Wetlands.** Because of the proximity to low-lying areas that may have wetland or quasi-wetland character, and/or because the sites are located in relative close proximity to coastal embayment's, it is possible there could be both federal and state wetland requirements.

  Federal. Federal wetland requirements arise under Section 404 of the Clean Water Act, and the Army Corp of Engineers (Army Corp) and EPA share permitting authority, except that the Army

Corp is the primary permitting authority and EPA's authority is limited to review and exception for cause. The municipalities have represented that neither project is likely to trigger CWA 404 jurisdiction, but EPA will need to ensure such requirements are not triggered. If triggered, the contractor must incorporate all such requirements into the design and construction of the project. For purposes of providing a GMP for the PWS, the Contractor shall assume that requirements arising under CWA 404 is not required.

State. The Contractor shall assume that any permit application requirements arising out of consideration of the Massachusetts WPA will be the responsibility of EPA and the municipality where the project site is to be located. EPA understands that such WPA permitting, if required, could affect the design, construction and overall project schedule. As part of its PSS process, EPA requested an opinion of likely WPA permitting requirements from the Cape Cod municipalities. It is likely that a Notice of Intent (NOI) will need to be prepared and submitted for a determination by the Conservation Commissions. The municipalities have represented that such determinations are likely to be successful, even though the Conservation Commission will likely need to affirm that a BMP for the control of nitrogen may not be "practicable" for the control of a 0.5 inch WQv and the control of 80% of total suspended solids (TSS) as ordinarily required under MassDEP Standards No. 4 and 7. In any event, we intend to weigh any such uncertainties as part of our Task 1 decision making. The contractor must incorporate all WPA requirements and local Conservation Commission requirements into the design and construction of the project.

- **NPDES.** The Contractor shall assume no additional NPDES permitting will be required for operation and discharge of treated stormwater. However, although the target pollutant is nitrogen, the Contractor shall incorporate control of pathogens (e.g., fecal coliform) into the design and construction to the extent practicable under the circumstances and as requested by EPA.

  BMPs to be designed for either Barnstable or Chatham will be retrofits; they will not occur in a new development or redevelopment context. In general, a retrofit does not represent a new discharge if constructed within the existing geographical bounds of the MS4; nor does a retrofit represent an increased discharge if it is designed to mitigate the discharge of pollutants to waters of the U.S. Although it is possible that a WQv of 0.5 (or 1) inch may not be possible for Barnstable under the Mass SW Standards, the contemplated retrofits for Barnstable and Chatham will mitigate appreciable runoff volume and pollutant loading from an existing MS4.

  Per 40 CFR 122.26(a)(9), *see* 40 CFR 122.26, a municipality is required to obtain a NPDES permit if the permitting authority "determines that stormwater controls are needed for the discharge based on waste load allocations that are part of [TMDLs] that address the pollutant(s) of concern . . ." *Ibid.* at 122.26(a)(9)(C). Both Barnstable and Chatham have MS4 permits; currently, the BMP retrofits intended for both Barnstable and Chatham contemplate discharging treated stormwater back to a permitted MS4. However, although the BMP retrofits are to be designed principally for the control of nitrogen, to the extent possible, these BMPs should also be designed to control bacteria, consistent with the following information on established TMDLs which is provided for convenience.

TMDLs:

- Pathogen TMDLs. A Final Pathogen TMDL was approved for the Cape Cod Watershed in August of 2009. Hyannis Harbor (Barnstable) is listed as Category 5 for bacteria and is included in this TMDL. Refer to http://www.mass.gov/eea/docs/dep/water/resources/a-thru-m/capecod1.pdf. Oyster Pond (Chatham) has been subject to an earlier TMDL for fecal coliform.
- Nitrogen TMDLs. Hyannis Harbor is listed as impaired for nitrogen (Cat 5), and a draft TMDL for nitrogen has been developed but has not yet been approved. A final TMDL has been approved for the Oyster Pond Embayment System. Refer to http://www.mass.gov/eea/docs/dep/water/resources/n-thru-y/oyster.pdf.

  A link to all TMDLs for the Cape is: http://www.mass.gov/eea/agencies/massdep/water/watersheds/total-maximum-daily-loads-tmdls-cape-cod-watershed.html. The State's integrated list of impaired water bodies is at: http://www.mass.gov/eea/agencies/massdep/water/watersheds/total-maximum-daily-loads-tmdls.html.

- **Construction General Permitting (CGP).** The Contractor shall assume that CGP requirements may apply for construction of a BMP retrofit in Chatham, and although it may be assumed that CGP requirements likely do not apply for construction of a BMP retrofit in Barnstable, the implications on project scope and feasibility of the proximity of the groundwater table nevertheless needs to be considered.

  In general, CGP requirements apply to construction activity if such activity (a) disturbs greater than one (1) acre and (b) results in a discharge to "Waters of the US". R*efer generally to*: Is CGP Coverage Needed?

  The actual size of the Chatham site is currently unknown; from aerial photographs and plot plans, the BMP site parcel reasonably appears to be more than an acre in size. However, it is not clear whether construction activity would affect more than one acre. To be conservative, it should be presumed that more than one acre may be affected. Therefore, depth to GW at the Chatham site is depicted as approximately 17 feet BG (approx. 9 ft. above mean sea level (MSL)) (as observed at soil boring OPF-4). *Refer to* "Existing Utilities and Proposed Sewer Extension.pdf" in Appendix 2B. However, the parcel targeted for BMP siting slopes quite significantly down from the roadway where OPF-4 was advanced. It might be that the 'basin' of the parcel is about equal elevation as the depicted sewer line (SL) (i.e., depth to GW of approx.. 11 ft. below SL at OPF-4); *but it could be* that the parcel is closer to the elevation of the "Existing Drain Pipe" depicted near soil boring OPF-5 (approx.. 13 ft. above MSL), which would mean that depth to GW is more like four (4) feet BG at the elevation of the parcel basin. Consequently, compliance with the CGP may be necessary and provisions for determining compliance with the CGP is set forth below in the scope of work.

  The site location for the Barnstable BMP is less than 0.35 acres. On the basis of comparison to the CGP compliance flowchart provided above, compliance with the CGP would therefore not be required. However, as part of Task 1 activities (below), the Contractor will need to determine the elevation above MSL of the BMP parcel and depth to GW. If not for CGP compliance, this data will be important to assess overall project scope and feasibility.

- **Underground Injection Control (UIC).** Our understanding is that (a) although the N BMP is a trench-based system, it is a self-contained closed system and (b) an infiltration basin is substantially wider than it is deep. For these reasons, we do not believe UIC permitting is applicable. However, we intend to confirm our understanding with our Drinking Water Program. For purposes of providing a GMP for response to this PWS, the Contractor shall assume that no UIC permitting will be required.

- **Local By-Laws / Ordinances.** It is likely Cape Cod municipalities have specific by-laws and ordinances that prescribe, among other things, aesthetic (and possibly structural) requirements for sheds / buildings; the format and style of signs intended for erection on public property; etc. The Contractor shall assume any such applicable requirements will be incorporated into the project.

V. Performance Work Statement: Design and Construction of N BMP

Under its Blanket Purchase Agreement, Contract # EP-BPA-13-W-0001 (expiration date Oct. 18, 2017), EPA Region 1 seeks a Guaranteed Maximum Price (**GMP**) for the following scope of work.

For its GMP, the Contractor shall cost each PSS location out individually. Total project cost for all PSS locations would be determined by summation of each PSS location. We are uncertain whether there might be sufficient project funding to accommodate more than one PSS location. However, depending on scope and cost, it might be possible to design two PSS locations even if only one may be constructed. Consequently, to assist in determining the cost feasibility of two PSS locations as a single project, the Contractor shall assume two PSS locations may be constructed taking into account any efficiencies that may be appropriate. For instance, there may be cost savings from travel expenses, or material inputs considering the BMPs will be of a same or similar type; if appropriate, the Contractor may assume that both projects can be designed more or less simultaneously, but that one BMP/project be constructed in the Spring of 2015 while the other BMP/project be constructed in the fall of 2015.

For each Task/Subtask, the Contractor shall provide a brief synopsis of project status by the end of each week to inform the project team of the ongoing status of the project; this can be in the form of a brief email (consisting of no more than a paragraph or two) to the Regional Contracting Officer Representative (COR) for distribution to the project team (as appropriate). The Contractor shall provide for brief monthly conference calls (as needed) to keep the project team updated as to the status of the project. The project may utilize EPA's teleconferencing facilities; EPA can provide teleconferencing details to the project team in advance of each call. Because the project involves construction activities and the requisitioning of materials likely requiring payment terms of thirty (30) days net, then to ensure timely payment and processing of invoices by EPA, the Contractor should plan to submit monthly invoices within the first few days of the beginning of each month.

For each Task and Subtask, the Contractor shall provide a line item cost / Level of Effort (**LOE**). As requested for certain Task or Subtask activities, the Contractor shall provide additional and separate line itemization (e.g., contingency line items).

Task 1: Independent Verification of EPA Preliminary Site Selections and Concept Level Design and Opinion of Cost

The Contractor will need to use its best professional judgment to independently confirm use of the PSS locations as suitable for the project and to provide a concept level of design and opinion of cost. As noted, each site is characterized by conditions that may tend to increase the complexity of the project (e.g., shallow depth to groundwater, constrained geographical nature of the site). This task may be viewed as a pre-design, '10% Design' or concept-level phase in part because it will include the collection of site data and some level of effort to gauge project feasibility – which implicates design work. Because the technology is innovative, this task needs to include a level of effort to review relevant and applicable literature on stormwater BMPs for nitrogen, and in particular, the 'Tedeschi' bioretention system designed and constructed by the University of New Hampshire Stormwater Center (UNHSC) in Durham, New Hampshire.

Task 1 will be coordinated by a project team consisting of EPA (Region 1 and HQ), the CCC, MassDEP, the Towns of Barnstable and Chatham, MA, and other project stakeholders, as appropriate (e.g., EPA's Office of Research and Development (ORD), and the University of New Hampshire's Stormwater Center (UNHSC), etc.).

Subtask 1A - Literature / Technology Review

Because the proposed technology is innovative, a subtask has been incorporated for review of relevant and applicable literature on stormwater BMPs for nitrogen, and in particular, the Tedeschi bioretention system designed and constructed by the University of New Hampshire Stormwater Center (UNHSC) in Durham, New Hampshire. The Contractor shall provide for a reasonable cost/LOE to survey the applicable literature on SW BMP design for control and treatment of nitrogen. The Contractor may provide for a site visit to Durham, NH to view the Tedeschi BMP as installed and to coordinate with UNHSC for this purpose.

Subtask 1B - Site Visits

The Contractor shall provide a cost/LOE for one visit to each PSS site(s) for its design team (e.g., one or more Principal and/or Senior Design Engineers / Scientists) to meet with municipal officials (assumed) and generally observe the conditions of each site and to collect any field data that may be appropriate or possible.

Such data may include taking engineering measurements, obtaining diagrams and taking photographs to help gauge topographical and hydrological site conditions, including potential site constraints (e.g., presence of above- or below-ground utilities, depth to groundwater) that will help the Contractor understand each PSS location. In addition, the site visits will help to identify whether or to what extent additional follow-up site visits (i.e., Subtask 1C) may be necessary for the collection of more time-intensive intrusive site data (e.g., test pits, soil borings, etc.).

It is assumed that Subtask 1B Site Visits could be coordinated in such a manner that 1 day would be required for visiting both the Barnstable and Chatham sites. EPA will take the lead in coordinating Subtask 1B Site Visits.[9]

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[9] Collection of data using more intrusive investigatory methods will require an access agreement. EPA intends to develop an agreement for site access upon conclusion of its PSS activities. We hope this access agreement can be executed by initiation of Subtask 1B. However, depending on the level of review necessary to execute the access agreement, the

To assist the Contractor and to reduce data collection costs, as appropriate, EPA is making available (**Attachment 2A and 2B**) existing site information and/or technical data (e.g., plans, schematics, etc.) that it received as part of its PSS activities. In addition, prior to Subtask 1B or 1C activities, EPA will coordinate with each municipality as appropriate to obtain or facilitate to obtain any additional data the Contractor may identify as necessary or recommended for this Task (e.g., the Contractor may need to get engineering plans for the MS4, examine one or more catch basins and EPA would take the lead to coordinate with the municipality to have one of its engineers / field technicians available to assist).

Subtask 1C - Data Collection and Analysis
Depending on the time available during the site visits in Task 1B and the ability to have collected all pertinent data necessary for this task, the Contractor shall provide for its design team to travel to each site (8 to 10 hours per day) to collect more intensive / intrusive data that may be needed for this task, such as test pits or boreholes, preliminary surface infiltration / percolation testing, land surveying, etc. The contractor will confer with EPA before making this determination.

For purposes of this Subtask, the Contractor shall determine the elevation of the Barnstable and Chatham parcel basins and depth to GW. On the basis of this information and for the Chatham site, the Contractor shall provide its opinion of whether construction activities will require compliance with the CGP; and if so, the scope of materials and activities necessary for compliance (e.g., sump dewatering). It should be noted that it is unlikely that any such discharge required for dewatering is likely to be "polluted" - meaning that compliance only with the CGP will likely be required. Refer generally to: Is CGP Coverage Needed? It may or may not be possible for any such construction dewatering to be discharged to the existing drainage ditch which traverses the site.[10] *Construction dewatering and compliance with the CGP (as needed) shall be provided as a separate contingency line item scope and cost*.

The Contractor should assume that it may take the lead in coordinating Subtask 1C activities directly with the municipalities; EPA is prepared to assist, as needed or requested.

Subtask 1D – Contractor Estimation of Project Feasibility
For this subtask and for the PSS sites evaluated for this Task, the Contractor shall provide for a LOE to evaluate the data obtained from Subtasks 1B and 1C and to develop a brief **Summary Memorandum** that sets forth the Contractor's professional engineering opinion of project feasibility and cost. The Summary Memorandum shall provide independent cost estimation for each site evaluated. The Summary Memorandum shall include consideration of any and all assumptions as may be necessary or appropriate, such as identifying any additional data collection that may be recommended or necessary for a final design; its assessment as to the likelihood for the need for permitting (e.g., Construction General Permit) and the implications of such on the time, cost and feasibility of construction; assumptions (or uncertainties) as to likely in-kind services to be best provided by the municipality (e.g., location and availability of electrical service); and preliminary estimations including equipment and sampling configurations for a monitoring program to determine BMP performance as outlined above and under Task 4 below.

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nature of Subtask 1B activities and the nature and timing of Subtask 1C activities may depend on and be determined by execution of the access agreement.

[10] Based on personal correspondence with Robert Duncanson, representative for Chatham. Again, the drainage ditch is apparently still utilized and, at some point further downgradient from the parcel, is piped and ties back to the MS4 just above the SW outfall to Oyster Pond.

In addition, and as may have been described in more detail above, *the following shall be provided as separate / contingency line items:*

- *Engineering calculations per Section IV(2) above;*
- *Determination of site elevation and depth to GW, and assessment of compliance with Construction General Permitting, if potentially applicable (i.e., Chatham), and if CGP applicability is unlikely (e.g., Barnstable), the cost and scope implications of depth to GW on overall project feasibility;*
- *Utility work (e.g., installation or tie-in of an electrical pole, installation of a CB into an MS4 line, removal / replacement of A/C units and pads, etc.);*
- *Health and safety provisions, as appropriate, such as providing materials and LOE necessary for stability of open trench lines to ensure worker safety and compliance with occupational safety and health regulations;*
- *Traffic management and control (e.g., police detail (as appropriate));*
- *Purchase of equipment (e.g., sampling shed, auto samplers, data loggers, etc.); and*
- *Clearing and removal of shrubs and trees (refer to Task 3).*

The Summary Memorandum shall be due within three (3) weeks of completion of data collection under Subtask 1C. The memorandum shall be initially provided in draft in MS Word format (with Microsoft Excel and/or PDF attachments, as appropriate). After EPA has reviewed and commented on the memorandum, the Contractor shall incorporate any such edits as appropriate and finalize the memorandum in both MS Word and Adobe PDF formats.

EPA will use the Summary Memorandum to make a final determination as to which site(s) will be chosen for design and construction of a SW BMP for control and treatment of nitrogen.

Task 2: BMP Design

After EPA notifies the Contractor of its final determination as to which site(s) it is choosing for N BMP design and construction, the Contractor shall develop a final design for the BMP retrofit(s), including detailed design specifications and plans for project construction.

For this task, the Contractor shall provide for any and all activities for the collection of any additional pertinent empirical site data (if any) that was not collected as part of Task 1. However, depending upon the adequacy of data / information collected for Task 1, this Task may simply constitute development of draft final plans and specifications (computer modeling, engineering calculations, material specifications, etc.), review and comment of such by the Project Team, and incorporation of comments received into a final design package.

It is important to emphasize the need for the Contractor to anticipate an adequate LOE for modifications to draft versions of the design which are likely to arise as a result of Stakeholder and Town review and comment.

To assist review and comment, draft and final design deliverables shall be in MS Word and Adobe Acrobat. Although such deliverables may be provided as a single file, it would help if design plates / plans could also be provided as individual files as any one of the files may be of use for responding to stakeholder comments or for purposes of education and outreach (e.g., development of power point presentations, incorporation into educational materials).

Following submittal to EPA, EPA will review and approve the Final Design and assess the overall feasibility of the project on the basis of cost and any hitherto unforeseen project requirements or constraints that may jeopardize the project schedule, which presumes commencement of construction in the spring of 2014 with a target completion date of May 1, 2015. Final design will meet all state, federal and local requirements.

Task 3: Construction

The Contractor shall provide an estimate for all aspects of BMP construction, providing that construction will not commence until approval by EPA of the final design. *The estimate shall be line itemized for labor, travel, materials, equipment and contingencies.* Line itemization is not intended as a control over Contractor discretion. Based on prior experience, line itemization is potentially helpful in negotiating uncertainties, including additions or offsets to scope as a result of unforeseen technical issues, stakeholder party review and comment or changes in expectations on behalf of stakeholder party representations of in-kind services. To the extent line itemization may be reasonably considered proprietary or otherwise confidential, the Contractor may identify each page of such information submitted as "Confidential". Such information may constitute Confidential Business Information (CBI) under EPA's July 1995 Office of General Council (OGC) Class Determination 1-95. Refer to http://www.epa.gov/ogc/documents/1-95.pdf.

The Contractor should be aware that for any project which requires tie-in to an MS4, EPA will need to schedule and conduct stormwater sampling activities to ensure that discharges of MS4 flow to a BMP are free of potential illicit discharges. Depending of the results of such activities, flow to the BMP may be prohibited or delayed until illicit sources are identified and resolved. Plans for construction should factor in such delays and otherwise be prepared to retrofit tie-ins to MS4 lines to prohibit/plug flow to the BMP.

The Contractor should also be aware that normalization of MS4 flow will be a critical aspect of ensuring BMP operation. EPA will need to work with the municipality(s) to ensure all catch basins and lines are clean and free flowing so that the design WQv can be achieved. Some field reconnaissance/activities may be required to track, troubleshoot or otherwise understand the operation and performance of the MS4 system.

Depending on the site chosen for BMP construction, the Contractor should be aware that site work may occur in areas highly visible to the public. In addition, it is likely the project will be periodically or regularly viewed by interested stakeholders, including the Cape Cod Commission and other municipalities. Proper attire and health and safety provisions (e.g., hard hats) are to be worn at all times, as appropriate. Depending on the depth, trenching activities may require slope stabilization to ensure worker safety.

For purposes of all Tasks, the Contractor may utilize any information obtained from EPA's PSS activities or its own engineering assessment due diligence activities (incl. discussions with the municipality) to determine, with reasonable or appropriate commercial certainty, the absence (or presence) of sub-surface utilities (water/sewer, gas, electrical, phone/cable, etc.). However, the Contractor must coordinate with Dig Safe prior to initiation of construction activities. *Refer to* Dig Safe.com. *See also*, Massachusetts General Law, Chapter 82, Section 40, 40A et seq. (summarized at Dig Safe).

Adequate provisions shall be made to ensure the pre-existing character and integrity of the site and to minimize site disturbance. EPA will make clear to all stakeholders regarding the inevitability of the presence and traffic associated with construction equipment, but the Contractor may assume such construction traffic will need adequate coordination and management, and will use its due diligence activities to determine a line item scope and cost for such coordination/management (including any detours and police details) if it appears reasonably likely based on an evaluation of the site that line item coordination/management is to be recommended. Task 1 activities will likely help to identify such management issues.

Where the location for the retrofit(s) is likely to implicate surface features, such as lawns, curbing, trees, etc., care and provisions shall be employed as necessary to ensure the structural and aesthetic integrity of these areas (i.e., good construction practice). Task 1 activities should adequately identify such features and concerns. Adequate provisions shall be made to ensure the pre-existing character and integrity of the site and to minimize site disturbance.

Where work will require the clearing of brush, shrubs and trees, the Contractor shall assume that disposal / processing of such debris will be the responsibility of the municipality. The Contractor shall clearly specify how much and what debris will be generated and provide for such debris to be staged at an agreed-upon location until such time as the municipality can process and dispose of such debris. Due to space constraints or other factors, it may be logistically important to schedule debris removal and processing in a real time manner, in which case it will be important to coordinate closely with the municipality. EPA can assist in this regard and Task 1 activities should specifically contemplate the needs for such coordination.

Excavated sub-base and native materials are not subject to regulation as solid waste and may be reused without exception provided these materials are not contaminated with oil or hazardous waste. The Contractor shall assume that any such materials shall be stockpiled for reuse by the municipality in an area near the site so designated.

Where it is necessary to cut and trench through existing parking lot or roadway areas, then provisions shall be employed as necessary to ensure the final structural and aesthetic integrity of such areas (e.g., patches made to restore pavement areas abut the existing pavement cleanly as characterized by good construction practice). As we understand it, all roadways fall under municipal jurisdiction, but Task 1 activities should specifically address how exactly construction in or near a roadway should best occur.

As of July 1, 2006, the State of Massachusetts specifically prohibits landfill disposal of asphalt. *See* 310 CMR 19.017(3) available at MassDEP Waste and Recycling: 310 CMR 19.017. As a matter of standard practice, asphalt plants will now accept old / weathered asphalt for reuse as recycled asphalt product (RAP). *See* 310 CMR 16.05(2) thru (5) and 310 CMR 19.006 (summarized in guidance at MassDEP Waste and Recycling: Use and Processing of ABC Rubble). The Massachusetts Aggregate and Asphalt Pavement Association (MAAPA) can provide a list of plants that may accept old asphalt and recycle it into new pavement. *Refer to* MAAPA website. The Contractor shall assume that for any appreciable excavation or asphalt, such asphalt shall be segregated from other native materials so that the Contractor can manage and/or transport excavated asphalt, as necessary, to an asphalt batch plant.

EPA anticipates the Contractor will need to incorporate a contingency for construction uncertainties; *the Contractor shall set forth the amount of the contingency as a separate line item.* Lastly, the EPA COR must be notified prior to commencement of construction activities.

Task 4: Development of Performance Monitoring Program and Infrastructure

BMP Performance monitoring will be an important parallel objective for the project. Specifically, this objective is to determine the performance of the N BMP and use collected physical and chemical data for developing a BMP performance curve, such as the one presented above under Section IV(1). Assessment of N BMP performance in this way will serve the multiple interests of EPA Region 1 including Region 1 programs (e.g., Permitting, Oceans & Coastal (estuaries), Water Quality, Grants, etc.), EPA's Office of Research and Development (ORD), EPA Headquarters, New England States and Municipalities, and other stakeholders (e.g., Cape Cod Commission, Narragansett Bay Commission, University of New Hampshire Stormwater Center (UNHSC), etc.).

In part because this aspect of the project will serve so many interests, the Contractor shall include a LOE that contemplates seeking out the advice and opinions of key EPA personnel, who will provide input and assistance on this Task. This includes: Mark Voorhees (OEP) (voorhees.mark@epa.gov, 617.918.1537, Marcel Belaval (OEP) (belaval.marcel@epa.gov; 617.918.1239) and Diane Switzer (OEME) (switzer.diane.@epa.gov; 617.918.8377) (collectively, the **NERL Team**). Mark has experience developing performance curves for EPA, Marcel has experience with groundwater sampling and analysis and Diane is the Regional Monitoring Coordinator for the New England Regional Laboratory, Chelmsford, MA (NERL). The Contractor should assume it can interact with Mark, Marcel and Diane, but consistent with Federal Acquisition Regulations (FAR), the COR needs to be kept informed of discussions. NERL will be involved with a number of aspects associated for this Task, including development of a QAPP and the specific analytical services for the monitoring program; Diane will be assuming a lead coordination role in this regard. In addition, all team members are likely to seek out the input and advice of the UNHSC which has extensive experience with stormwater BMPs, including specific sampling protocols for, among others, the Tedeschi-type bioretention BMP.

For this Task and in concert with the NERL Team, the Contractor shall develop a physical and chemical sampling program (including equipment) (i.e., **Monitoring Plan**) necessary for determining BMP performance. This will include the planning (sequencing, positioning) of physical (input / output flow, rainfall gauges (as appropriate)) and chemical data collection for up to 20 storm events per year.

The Contractor shall assume that a Quality Assurance Project Plan (**QAPP**) will be required for the collection and analysis of Task 4 data and that the NERL Team will assume a lead role in developing the QAPP, but that the Contractor will need to review drafts of the QAPP as it develops and provide input to the NERL Team - development of a successful Task 4 monitoring program will necessarily require consideration of the QAPP.[11] For instance, among other things, the Monitoring Plan should indicate whether auto samplers should collect individual grab samples or one flow-composite sample for each site during an event (generally flow-composited samples have less volume than other composites, so it will be important to determine if chemistry sample volume requirements are met for those storms causing fluctuating flows. Prioritizing sample analyses would be helpful if this event does occur); the criteria for storm events that should trigger monitoring may need to be determined: is there a minimum

[11] NERL indicates the draft QAPP is typically provided after the draft Monitoring Plan is available, and is to be finalized after the Monitoring Plan is finalized. A recommended schedule is provided in Table 1.

rainfall, or should the presence of any runoff trigger the monitoring event? What is the antecedent dry period, if one is preferred?). The Contractor shall assume, however, that any and all data collected from Task 4 will be submitted to EPA and used internally and/or channeled through other existing EPA contracts where, because the development (mathematical assessment and modeling) of BMP performance curves is already established, a QAPP will not be needed for this aspect of performance curve development. A final EPA-approved QAPP will be required before any monitoring or sampling is conducted. In part because NERL may need time to adjust its subcontracts, the Contractor shall assume that development of a QAPP will occur in earnest in the fall of 2014.

The Contractor shall assume the primary data for assessing performance will be nitrogen (specific suite of forms/ions to be established by the NERL Team) and the flow rate at both BMP input and output locations.[12] This necessarily assumes that for each N BMP constructed, program infrastructure will need to accommodate two (2) auto samplers. How exactly to obtain and maintain auto samplers for the project is currently a matter being discussed by the NERL Team. It is more likely that NERL would purchase the auto samplers, and help train the municipality(s) to maintain then. However, for purposes of conservative budgetary estimation and developing a GMP in response to this PWS, the Contractor shall assume that it would purchase the auto samplers and that upon completion of the project, the auto samplers would become the property of the municipality or the Cape Cod Commission. *This cost should be provided as a separate line item.*

It is *possible* the project could incorporate additional data elements (e.g., dissolved oxygen (DO) specific conductance, temperature, TSS/turbidity, pH and oxidation reduction potential (ORP)), but collection of such data using, for instance, sondes (e.g., www.YSI.com, or lower-cost recording meters for basic water quality parameters), may be problematic in the long term and consequently, impractical. The NERL Team and the Contractor will discuss incorporation of such additional data elements into the project, but for purposes of conservative budgetary estimation and developing a GMP in response to this PWS, the Contractor shall assume that if such data elements will be incorporated, that any such equipment purchased by the Contractor would become the property of the municipality or the Cape Cod Commission at the end of the project. *The cost and provisions for such equipment / data should be provided as separate line items (as appropriate).*

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12 Currently, the relevant nutrient analytical capabilities of NERL include:

- Total nitrogen (TN) by persulfate digestion (Lachat method LG208 and /ASTM method 4500-N-C) (reporting limit: 0.05 mg/L);
- Nitrate (NO^{3-}) (EPA Method 300.0);
- Nitrite (NO^{2-}) (EPA Method 300.0);
- Nitrate/Nitrite (EPA Method 300.0);
- Ammonium (NH^{4+}) (EPA Method 300.0); and
- Total phosphorus (TP) by persulfate digestion.

In addition, NERL can subcontract for:

- Ammonia (EPA 350.1 and ASTM 4500-NH_3);
- Total Kjeldahl Nitrogen (TKN) (EPA 351.3); and
- Total Nitrogen calc from ammonia and TKN.

The Contractor should assume that samples collected from auto samplers will be shipped or otherwise transported to EPA's NERL for analysis. The Monitoring Plan will need to consider the logistics associated with, for instance, storm events that occur during the night.

If as a result of Task 1 decision making, Chatham is the choice for construction of both an N BMP and an infiltration BMP, the BMP design should contemplate periodic collection of samples for determination of total suspended solids (TSS) and pathogens. Our understanding is that Chatham has extensive experience with TSS and pathogen sampling for Oyster Pond, and consequently, EPA may negotiate a Memorandum of Understanding (**MOU**) with Chatham where Chatham assumes the cost and responsibility for such sampling. Alternatively, the responsibility and cost may be a joint collaboration of the CCC and Chatham. In any event, the Contractor shall incorporate the physical provisions for TSS and pathogen sampling into the design and construction of BMPs for Chatham.

A monitoring program for purposes of this Task would very likely be facilitated by employment of real-time data loggers. Data loggers may be provided by EPA's NERL. Again however, for purposes of conservative budgetary estimation and developing a GMP in response to this PWS, the Contractor shall assume that it would purchase data loggers and that upon completion of the project, the data loggers would become the property of the municipality or the Cape Cod Commission. *This cost should be provided as a separate line item.*

The sampling equipment will require housing, so the Contractor shall provide a small weatherized shed adequate for housing, operating and securing the equipment. The shed will need to be manufactured using renewable and/or recyclable materials. A plan/schematic of the proposed shed, and sampling areas would be helpful, when available, in planning how to arrange equipment, and the frequency of servicing outside of storm events. The shed and its installation must meet all building code requirements. To the extent possible, it should also mimic the Cape architecture and be stained in a color (e.g., cedar shingles or other covering as specified by the Town) consistent with Cape Cod. It is likely the shed will require single-phase 115V electrical service (e.g., for powering auto samplers, etc.); if so, the Contractor should plan for electrical service to be delivered to the shed by an electrical subcontractor which meets all electrical code requirements. During Task 1 activities, it will be important to inquire as to whether the municipality may provide electrical service as an in-kind which EPA will incorporate into an MOU. Again, the Contractor shall conservatively assume that it will coordinate and provide for the service of an electrical subcontractor. In addition, the Contractor shall assume to provide sample containers, preservatives and coolers for each municipality where an N BMP is constructed.

The Contractor shall assume that once installed, it will work closely with the municipality and the NERL Team to initiate the training, monitoring and establish proper operation of all equipment. It is assumed this will include some oversight and training of the municipality for a period of 4 to 5 storm events.[13] After that period, it is assumed the municipality (and/or NERL Team) will take over the operation and maintenance of the equipment, with the NERL Team providing oversight of sampling equipment upon request. For this reason, by the end of Construction activities, the Contractor shall provide any and all pertinent information (manuals, specification sheets, etc.) necessary for operation and maintenance of sampling equipment and shed. The Contractor shall plan on meeting with municipal and EPA personnel to go over the equipment and its operation.

[13] The Contractor may recommend and budget for a training regimen, which may include up to one day of intensive hands-on training, in addition to a day for a "dry run" to determine if there are gaps in shared information and procedures for notifications, sampling, sample processing and transport.

Task 5: Operation and Maintenance (O&M) Plan

We anticipate O&M will be the responsibility of the municipality in which the retrofit is sited. For each constructed site/BMP, the Contractor shall develop a brief one to five page O&M plan containing a summary or listing of relevant O&M procedures that can be provided to the municipality following completion of the project. This O&M plan should be based on and be consistent with any BMP-specific O&M requirements specified by the Massachusetts Stormwater Standards. In addition, specific provisions should be included regarding short and long-term maintenance for newly-installed plants or shrubs; maintaining normalized MS4 flow (e.g., CB cleaning and inspection) and requirements for periodic illicit testing (and tracking, as appropriate). It is often helpful to identify specific O&M prohibitions, if any (e.g., moratorium on winter sanding application / practices for porous asphalt BMPs).

Because certain O&M activities (sampling shed maintenance, watering of tress/shrubs/plants/ grass seed) may need to be implemented immediately following construction activities, a draft of the plan is to be provided to EPA no later than approximately two (2) weeks before the end of construction activities, so that it can be reviewed, modified as appropriate, and provided to the municipality once construction is complete.

Task 6: Education and Outreach

This project is intended to enhance technical and general understanding of stormwater, control and treatment of nitrogen and its impacts, and innovative GI-based solutions.

This education and outreach project will include, as part of construction activities, the manufacture and installation of one or more clearly-visible signs to inform users of, among other things, the challenges associated with stormwater in general, control and treatment of nitrogen in stormwater, the nature and existence of the N BMP, a cross-section schematic of the N BMP design, the environmental benefits of the N BMP (e.g., improved water quality), inclusion of 'before and after' photographs and provide contact information.

One objective of Task 1 activities will be for the project team to begin coordination on a conceptual design for the sign(s), including: overall logistics and signage details such as language (including logos); conceptual nature of photographs and schematics; format, font, color, size; to identify one or more locations for the sign(s), as appropriate; and to ensure compliance with applicable municipal ordinance(s) (as appropriate).

Using a representative design schematic to be provided to EPA from the final design, EPA will develop a technical drawing incorporating all input design elements as part of construction activities. This technical drawing will be provided to the Contractor as a finalized artistic design file (Adobe Illustrator or InDesign). The design file will provide sign dimensions and other necessary specifications, including kiosk or street sign preferences.

With this design file, the Contractor shall arrange to manufacture the kiosks/signs using environmentally sustainable weather-proof materials. The Contractor shall assume to erect the kiosk/signs at the site. The contractor may be asked to do one of the following optional tasks: 1) produce a public educational brochure in color on the project. Conduct a present to the Town where the project is constructed as well as other Cape Towns that are interested.

Table 1: Deliverables and Schedule (Tasks 1 - 5)

Project scheduling is predicated on targeting BMP construction for completion by May 1, 2015 and extrapolating backwards. In part because there may be some flexibility in the May 1 target completion date, the scheduling of other tasks may be adjusted as needed, and/or based on clarifications made possible by Task 1 activities.

Product	**Delivery dates (Approx. 7 month total duration)**
Task 1. Independent Verification of EPA Preliminary Site Selections and Concept Level of Design and Opinion of Cost	
• Subtask 1A - Literature / Technology Review	Delivery: Coincident with Task 1 subtasks; to be completed before submittal of the Task 1D Memorandum.
• Subtask 1B - Site Visits & Kick Off Meetings with each of the two towns	Delivery: Within 2 weeks of signing of the Project Task Order
• Subtask 1C - Data Collection and Analysis (Note: schedule requires and may be contingent upon a signed access agreement)	Delivery: Within 4 weeks of signing of the Project Task Order
• Subtask 1D – Contractor Estimation of Project Feasibility. Draft Summary Memorandum.	Delivery: Within 7 weeks of signing of the Project Task Order; or within 3 weeks of completion of Subtask 1C activities.
• Subtask 1D – Contractor Estimation of Project Feasibility. Final Summary Memorandum.	Delivery: Within a week of receipt of EPA and project Stakeholder comments on the Draft Memo
• Weekly status updates	Delivery: weekly
• Monthly progress notes concurrent with invoicing	Delivery: For past month work activities, within the first few days of the beginning of each month.

Task 2. BMP Design	
• Initiation of work activities	Delivery: Upon EPA Approval of the Task 1D Final Summary Memorandum.
• Draft Full Design (including construction schedule)	Delivery: Within 4 weeks of EPA Approval of the Task 1D Final Summary Memorandum
• Final Design	Delivery: Within 1 week of receipt from EPA of final comments on the Draft Design
• Weekly status updates	Delivery: weekly
• Monthly progress notes concurrent with invoicing	Delivery: For past month work activities, within the first few days of the beginning of each month.
Task 3. BMP Construction	Delivery Objective: To commence in March or April of 2014. To be completed by May 1, 2015 if possible; but in no case later than mid-June of 2015.
• Weekly status updates	Delivery: weekly
• Monthly progress notes concurrent with invoicing	Delivery: For past month work activities, within the first few days of the beginning of each month.
Task 4. Development Performance Monitoring Program and Infrastructure	Delivery Objective: 1. Draft monitoring plan for review & final scoping by November 30, 2014; 2. Draft QAPP for review by January 15, 2015; 3. Final monitoring plan by February 28, 2015; 4. Final QAPP by March 31, 2015.
Task 5. O&M Plan	
• Draft Plan	Delivery Objective: No later than two

• Final Plan	(2) weeks before the completion of Task 3 activities. Delivery Objective: Upon completion of Task 3 activities.
Task 3. Education and Outreach	Delivery Objective: To commence in April of 2014. To be completed by July 1, 2015 if possible; but in no case later than Sept 15, 2015.

Note: EPA intends to provide all reports produced under this contract for public dissemination, as appropriate. The Contractor shall provide electronic and hardcopies of specified notes, monitoring data, designs and reports (*.pdf, *.docx and *.xlsx), as well as electronic copies of all supporting information, including site plans and BMP design. Additionally, the government reserves the right to release the information in derivative documents.

Table 2. Summary of EPA or EPA-Stakeholder-provided Information, Tasks and/or Equipment

Task 1

1) Conference room and teleconferencing facilities (municipality).

Task 2

1) Site access; access agreements;
2) Assessment of federal and state wetland permitting requirements, if any;
3) Negotiation and development of an MOU with each municipality;
4) Design file for BMP education and outreach sign.

Attachment 1

From: Simpson, Karen On Behalf Of Hamjian, Lynne
Sent: Wednesday, June 11, 2014 4:32 PM
To: Simpson, Karen
Subject: Stormwater BMP Project Opportunity for South Coastal Cape Cod Communities

Dear South Coastal Cape Cod Communities:

EPA Region 1 would like to make you aware of a new and exciting opportunity to work with EPA to implement a stormwater treatment system and education project in a Cape Cod community. As part of its Southeast New England Coastal Watershed Restoration Program, EPA Region 1 will directly implement a stormwater best management practice on one or more properties on Cape Cod. This project will complement nutrient management projects that will be funded by EPA grants to the Narragansett Bay and the Buzzards Bay National Estuary Programs.

For purposes of this project, EPA plans to partner with a municipality on Cape Cod within watershed that drain to the south facing coast either through surface water or groundwater (see list below)[1]. EPA plans to install a stormwater best management practice (BMP) on one or more properties. Depending on the site, the stormwater will be treated using either a gravel wetland or bioinfiltration internal storage reservoir to control nitrogen as well as other pollutants (such as bacteria, sediment, etc.). The purpose of this project is not only to treat stormwater from a discharge, but to educate municipal officials and the public about these types of BMPs and their ability to reduce nitrogen and other pollutants. Accordingly, the project will include a strong educational component.

One of EPA's broader goals is to take the lessons learned from this project to demonstrate and encourage the application of stormwater BMPs that control nitrogen throughout New England. Although stormwater is not the predominant nitrogen source in many embayments, the amount of nitrogen that must be removed to achieve water quality standards is often large. As a result, we need to identify effective ways to reduce nitrogen from all sources.

EPA is undertaking this work directly through a Contractor because of our strong interest in supporting MA Department of Environmental Protection's Cape Cod TMDLs for total nitrogen and the planned Clean Water Act section 208 water quality plan update under development by the Cape Cod Commission. The Agency expects to provide site design, site reconnaissance, selection, preparation, and construction, including installation of educational signs/kiosks. We also plan to develop and design an operation and maintenance protocol for the constructed BMPs. We anticipate the project will be sited on a municipal lot/parcel. The construction portion of the project must be completed by the end of the calendar year 2015, with the bulk of construction completed by the end of the summer of 2015.

We are inviting municipalities to propose sites for this educational project. The parcel should have visibility and room for signs/kiosks. Examples could include a beach, school, park, ball field, or other municipal or other publicly accessible property or right of way. The municipality will need to provide EPA and its Contractor(s)

[1] Although the Southeast New England Coastal Watershed Restoration Program covers Southern Cape Cod to Pleasant Bay and includes the Islands, EPA has decided for this solicitation to implement a project in the Southern Cape municipalities and not the Islands. Funding, logistical and timing constraints and the fact that EPA is supporting the section 208 wastewater management plan update process necessitate this focus. Please note this solicitation also excludes Bourne and the portions of Falmouth that drain to the Buzzards Bay Estuary because those areas are covered by the Buzzards Bay National Estuary Program grant program mentioned above.

access to the site (via an access agreement) for the length of the educational project. The municipality will also be responsible for operation and maintenance on the site once construction is complete.

If you are interested, please submit a brief statement of interest (no more than 1-2 pages) to Ray Cody (cody.ray@epa.gov) and Karen Simpson (Simpson.karen@epa.gov) no later than COB July 2, 2014. Please attach photos or site plans if available. Information should include a best estimate of impervious area contributing to the discharge, and the size of the area available to construct a stormwater treatment system. The statement of interest should also include the following:

- specify your community's interest in this project, and willingness to participate and facilitate in project planning and coordination (as appropriate);
- describe any support or in-kind services your community is willing to provide (note there is not a set match requirement);
- affirm that your community will agree to undertake the specified operation and maintenance program necessary to ensure the proper operation of the stormwater treatment system;
- include the name, email, and phone number of a municipal point of contact. If the project is selected, this person will need to be the lead on this project and be willing and able to work with EPA;
- identify and describe the lot (or portion thereof) and parcel number, including the size and a brief description of the existing lot and why you selected it; ideally, the lot should be publicly owned and publicly accessible;
- specify how soon project construction can begin on the lot;
- describe the location of the lot in relation to nearby water bodies and to the south coast of Cape Cod. Also include whether those water bodies are impaired (listed under Class 4a or 5 of the MA Integrated List of Waters) or are adversely affected by excessive nitrogen loading (for information on impaired waters, please visit the following link: http://www.mass.gov/eea/agencies/massdep/water/watersheds/total-maximum-daily-loads-tmdls.html#2);
- describe any state, federal, or local permit requirements (e.g., MA Wetlands Protection Act, federal section 404 permits, UIC permitting, EPA NPDES stormwater permitting, etc.) that may be required, how you will assist in obtaining the appropriate permits prior to the initiation of site activities, and the time frame required to obtain the necessary approvals. Projects with impacts to wetlands or with complicated permitting requirements are not encouraged for this solicitation. The proposed site should not be located on or near soils contaminated or potentially contaminated with oil or hazardous waste(s);
- explain any current or anticipated connection to a municipal separate storm sewer system (MS4); and
- verify your willingness to show other municipalities the site during and after construction, and for the duration of the project.

EPA anticipates entering into a Memorandum of Understanding with the selected municipality to work cooperatively to monitor the success of the project, develop an operation and maintenance protocol and schedule, and educate the public and other municipal officials throughout the watershed and from other cities and towns. We anticipate that the entire length of the project will be approximately 3 years.
EPA will review all submittals and conduct site visits and interviews prior to our decision. After we receive submissions, we may schedule a visit for the most promising projects to better understand your proposal and collect additional information that may help us in reviewing your proposal. Depending upon scheduling, we expect to notify you within a few weeks once we've selected the site.

For further information, we have arranged a call with all interested communities on Monday, June 16, 2014 from 10:00 am to 12:00 noon [call in number: (617) 918-2822; password: 263438]. On the call EPA

staff will provide more details about this project and provide an opportunity for you to ask questions. We will leave the line open for this full period so you can call in during any time. If you cannot make this call and/or have any questions, please do not hesitate to contact Ray Cody at (617) 918-1366 or Karen Simpson at (617) 918-1672.

Thank you for your interest in this matter. Please pass along to community stakeholders who may be interested and eligible. We look forward to hearing from you.

Lynne Hamjian
Surface Water Branch Chief
US EPA
5 Post Office Square, Suite 100
Mail Code: OEP06-01
Boston, MA 02109-3912
(617) 918-1601

Cape Cod Communities Eligible for Stormwater BMP Projects
Falmouth*
Sandwich*
Mashpee
Barnstable
Yarmouth
Dennis
Harwich
Chatham

A large portion of Falmouth and a small portion of Sandwich drain to the Buzzards Bay watershed. Projects proposed in these portions are eligible to receive SNECWRP funding through the Buzzards Bay NEP and therefore* ***are not eligible to receive technical assistance through this Southern Coastal Cape Cod solicitation.* *For a map of the Buzzard's Bay study area visit: http://buzzardsbay.org/images/buzzards-bay-nep-study-area.jpg*

[1] Although the Southeast New England Coastal Watershed Restoration Program covers Southern Cape Cod to Pleasant Bay and includes the Islands, EPA has decided for this solicitation to implement a project in the Southern Cape municipalities and not the Islands. Funding, logistical and timing constraints and the fact that EPA is supporting the section 208 wastewater management plan update process necessitate this focus. Please note this solicitation also excludes Bourne and the portions of Falmouth that drain to the Buzzards Bay Estuary because those areas are covered by the Buzzards Bay National Estuary Program grant program mentioned above.

Attachment 2A and 2B

Site Data (Plans, Schematics, Photos, etc.)

Note: This Appendix to be uploaded to WaterVision's FTP site

Attachment 3

Available Technical Information on Tedeschi-type Bioretention N BMP

Note: This Appendix to be uploaded to WaterVision's FTP site